

METOC and Naval Afloat Operations: Risk Management, Safety, and Readiness

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Study Goals

Identify METOC related afloat mishaps, their costs, and possible methods for reducing the impacts of these mishaps on fleet readiness.

1. Direct Costs

- **Lives Lost**
- **Dollars Lost**
- **Labor Lost**

2. Indirect Costs

- **Loss of Readiness**
- **Investigation Costs**
- **Litigation Costs**
- **Damage to Reputation**

Data and Methods

**8000 class A, B, and C afloat mishap reports,
Mar 1997 – March 2002, from Naval Safety Center**

Mishap records used to identify:

- 1. METOC related mishaps (MRMs)**
- 2. costs of these mishaps**
- 3. phenomena & operating conditions during mishaps**

**Most reports provided only a general narrative
description of METOC phenomena and operating
conditions.**

METOC Related Mishaps (MRMs)

In an MRM, one or more of the following occurred:

1. METOC phenomena significantly increased risks.

Exs:

- High winds/seas**
- Tides and currents**

2. METOC related operational deficiencies increased risks. Exs:

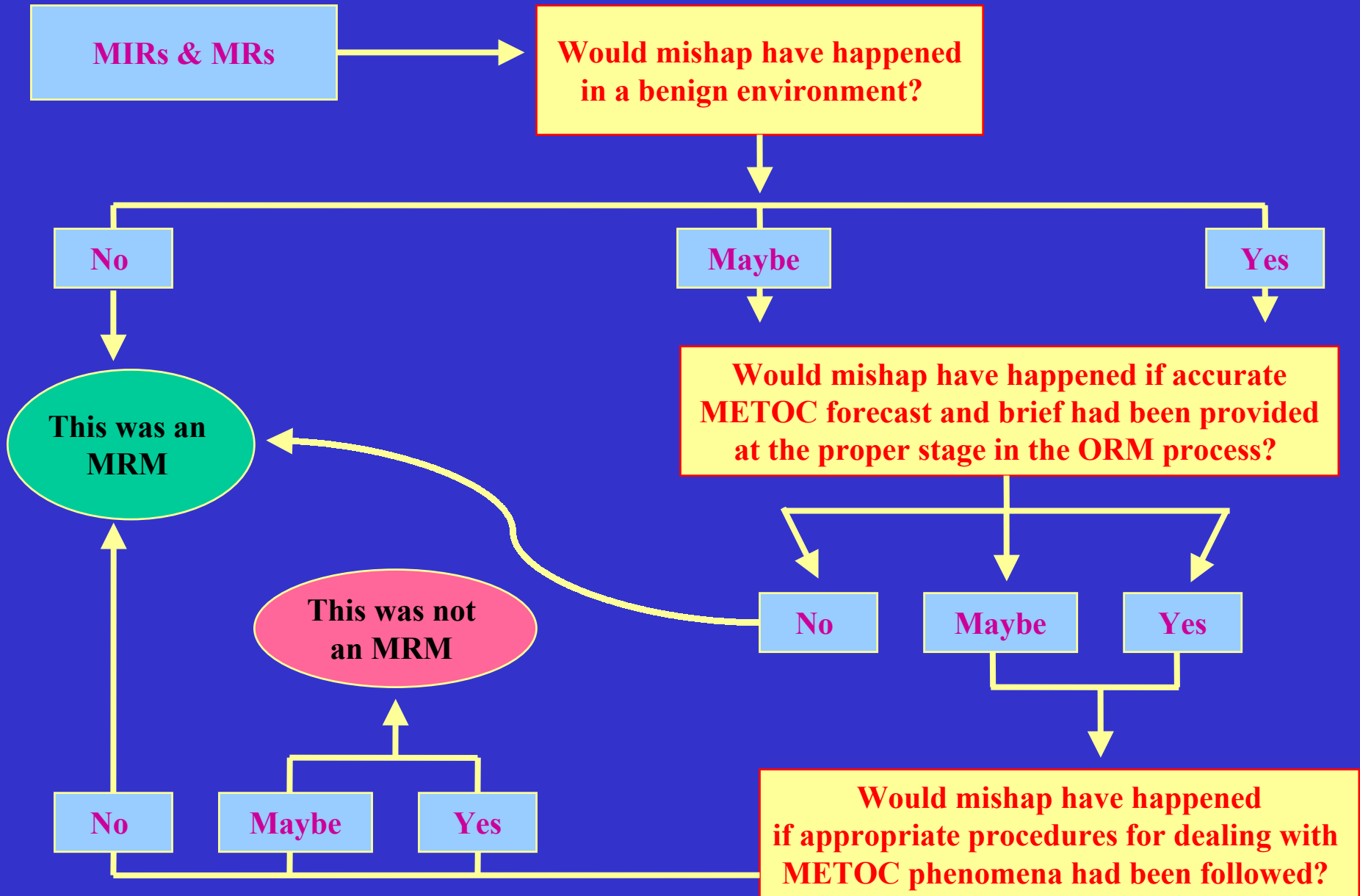
- Breakdown in risk management**
- Lack of forecast**
- Communication breakdown**
- Lack of training and/or competence**

Identification of MRMs

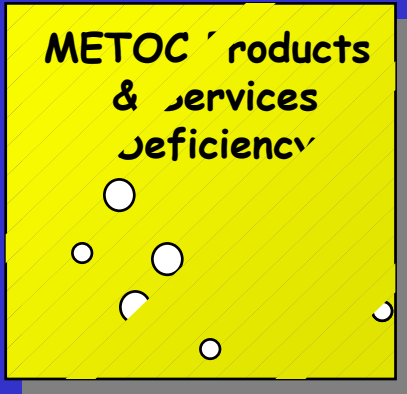
Identified MRMs using the “Practical Man” Test.

- Yes, No, Maybe
- PMT requires qualified analyst to conduct test.
 - Surface Warfare Officer
 - Afloat Safety Officer
 - METOC Officer
- Received second opinions from other Naval officers.

Analysis Approach: Practical Man Test

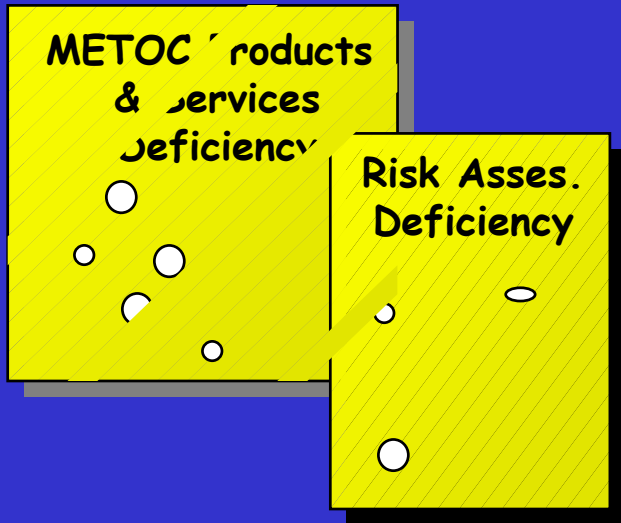


Potential Chain of Events for METOC Related Mishaps



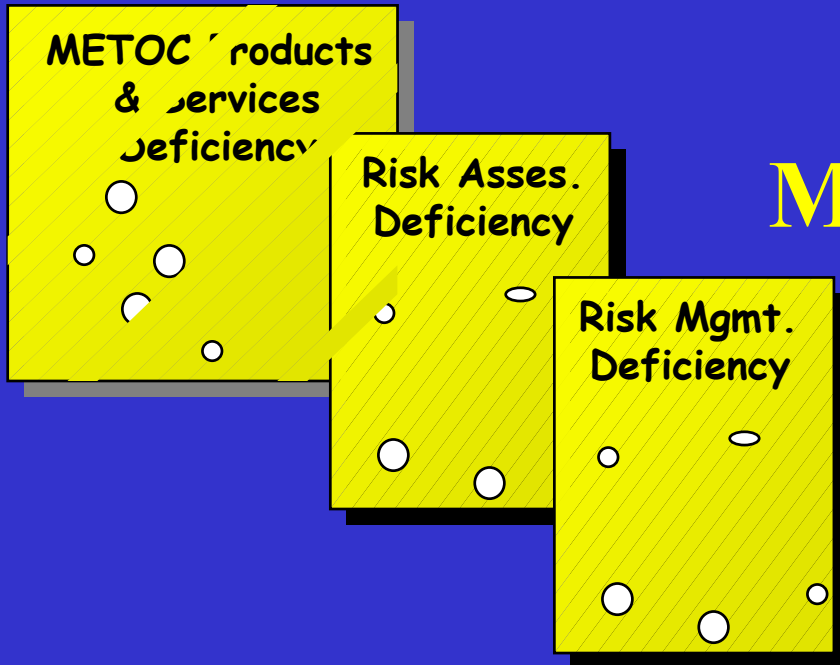
METOC Aspects of Naval Afloat Safety
Thesis Research by LCDR Brett Martin, USN
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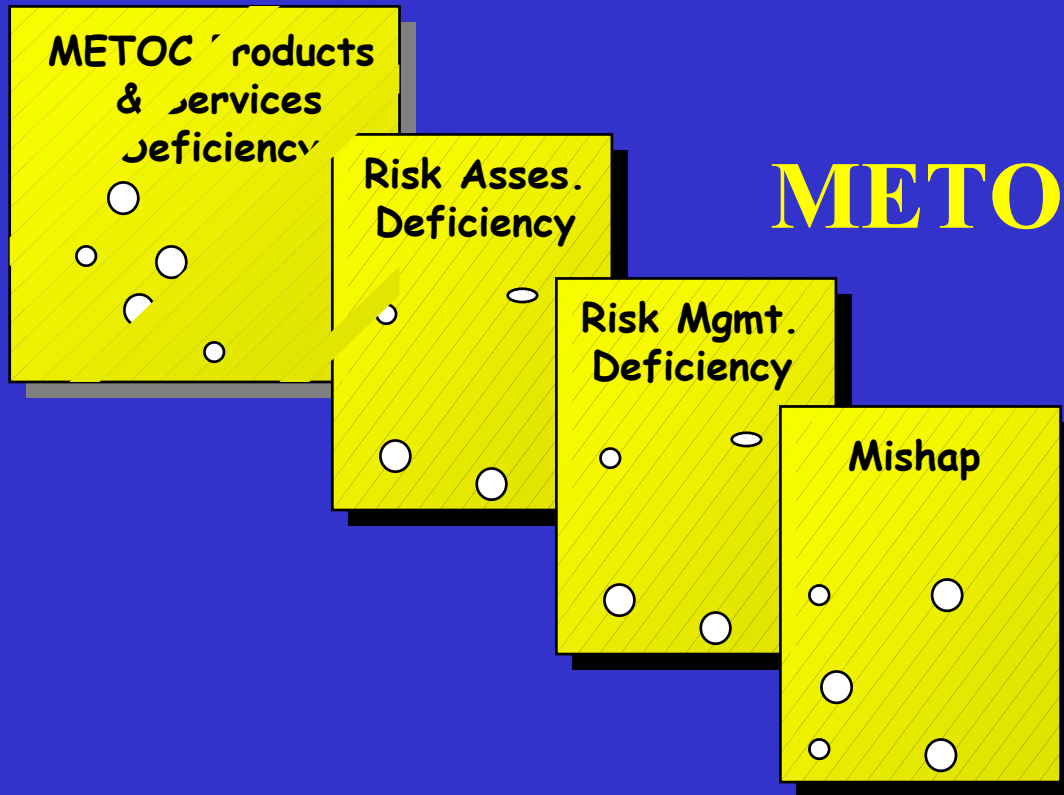
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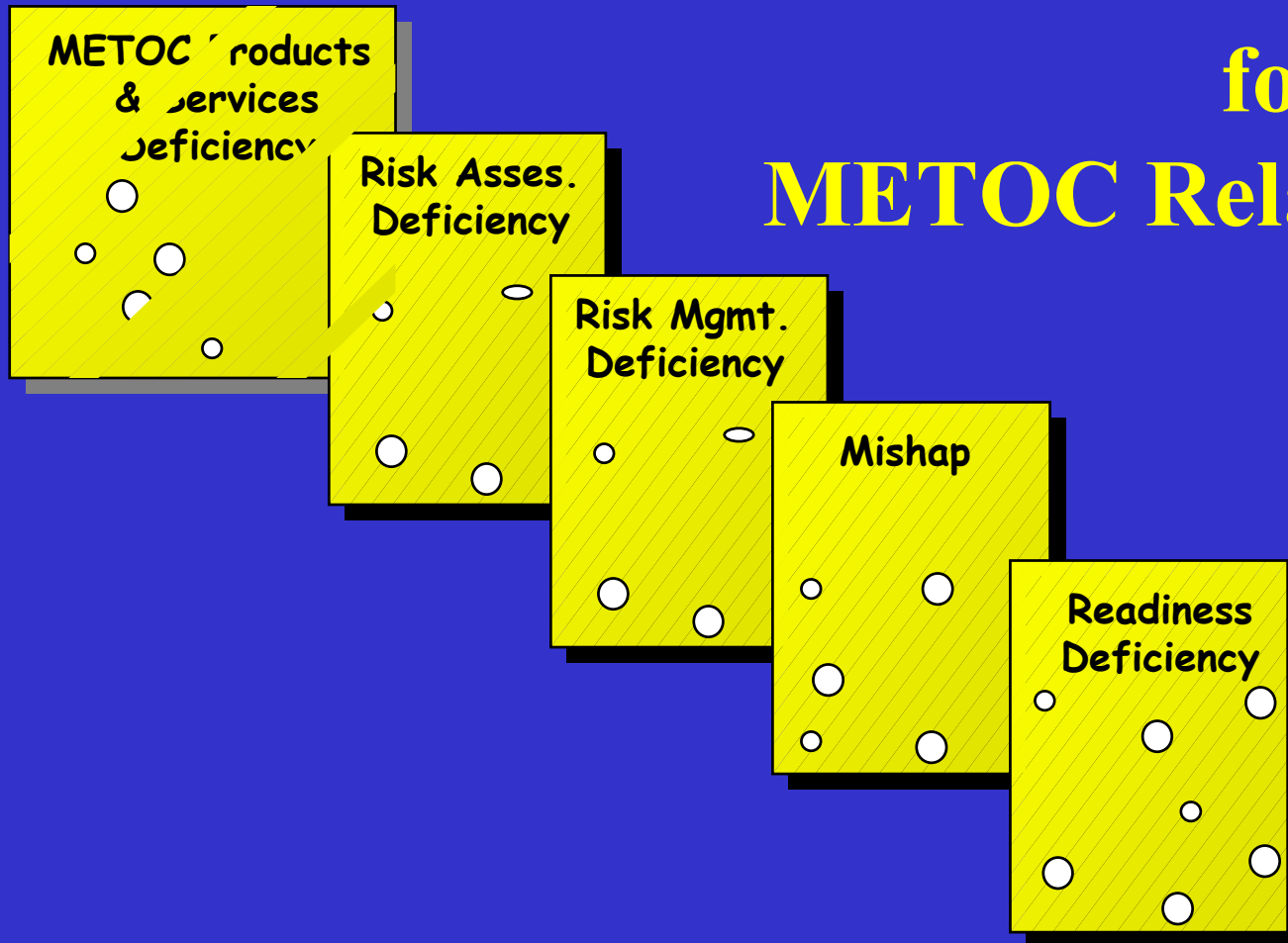
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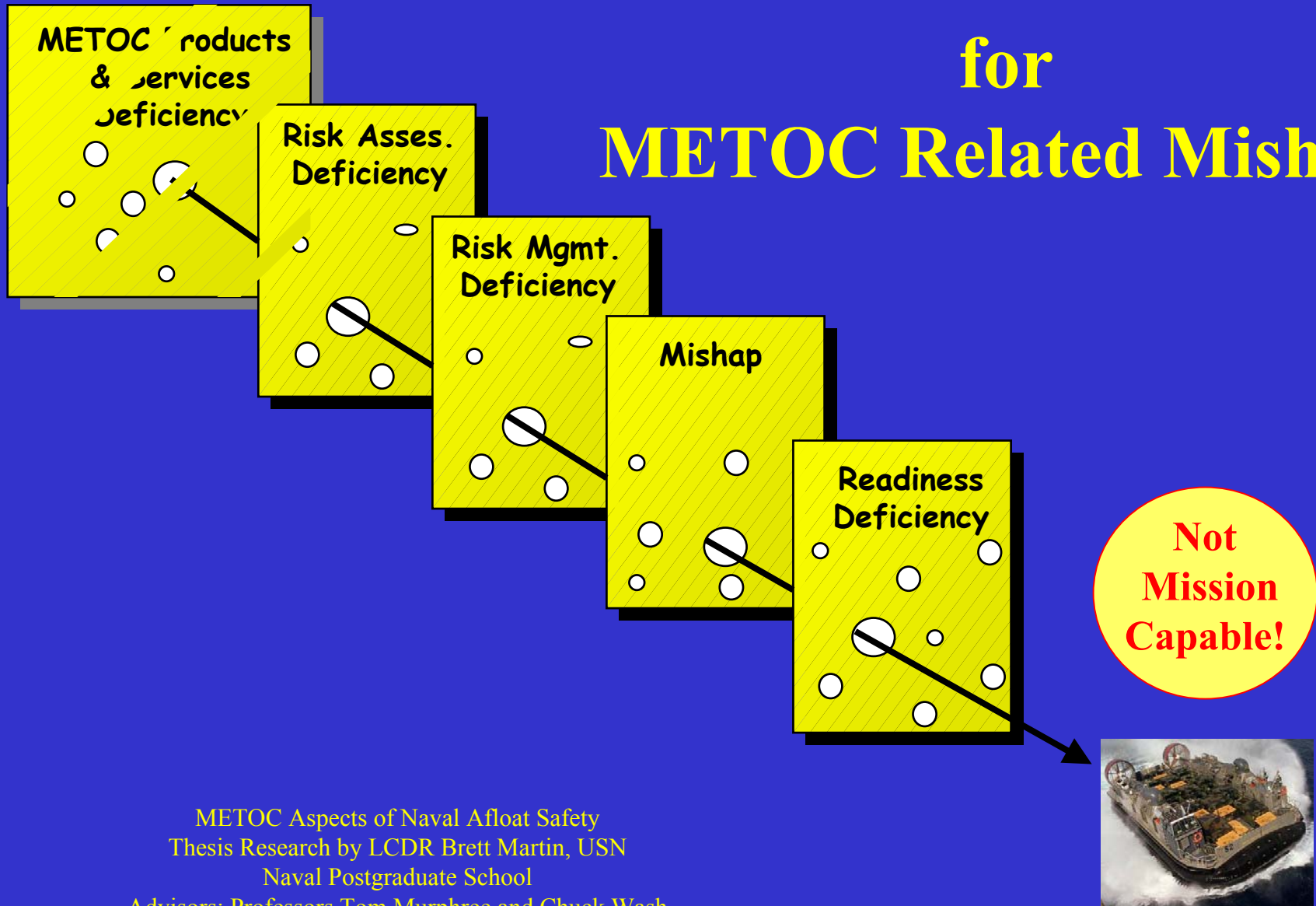
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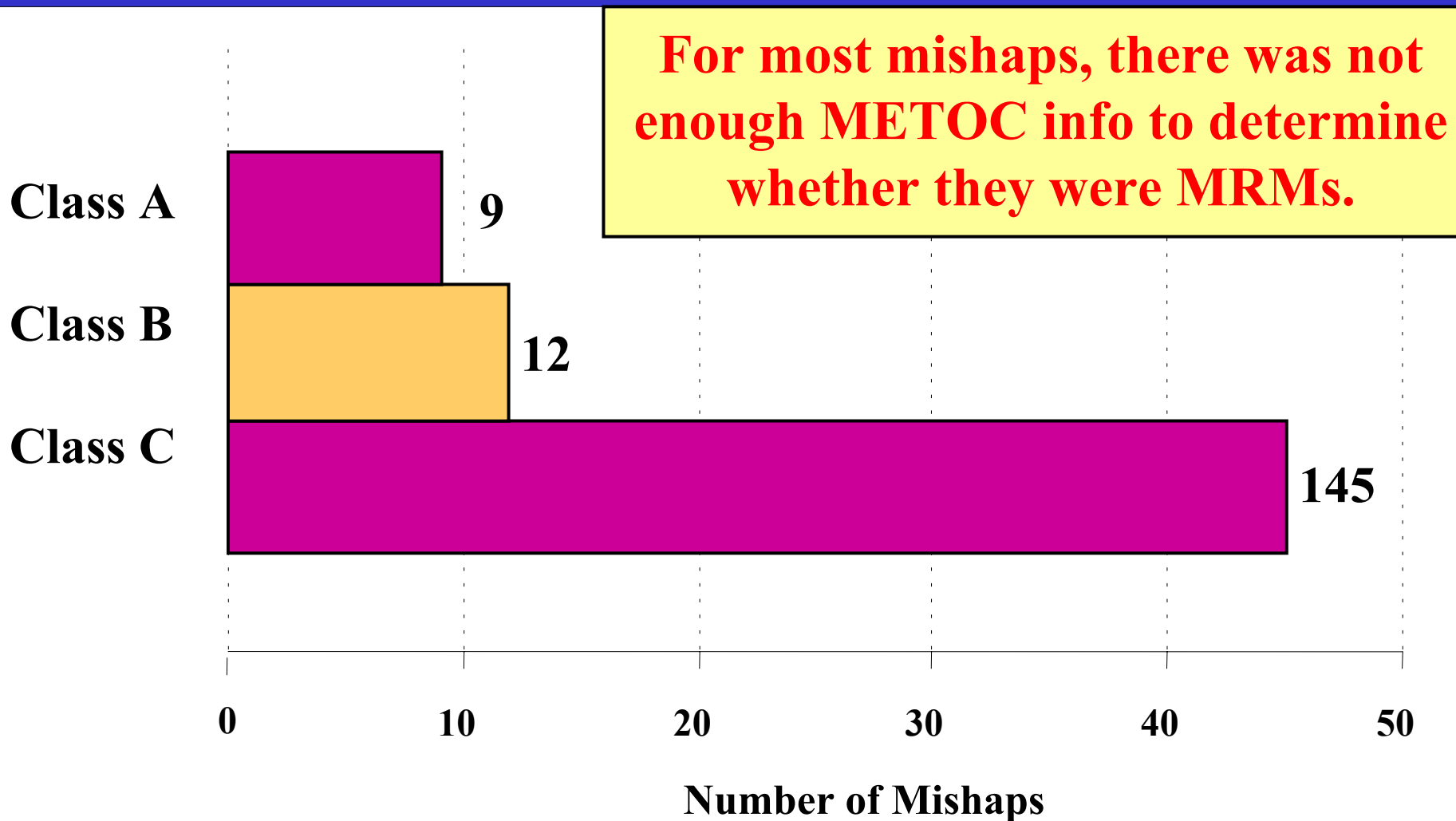
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METOC Related Mishaps

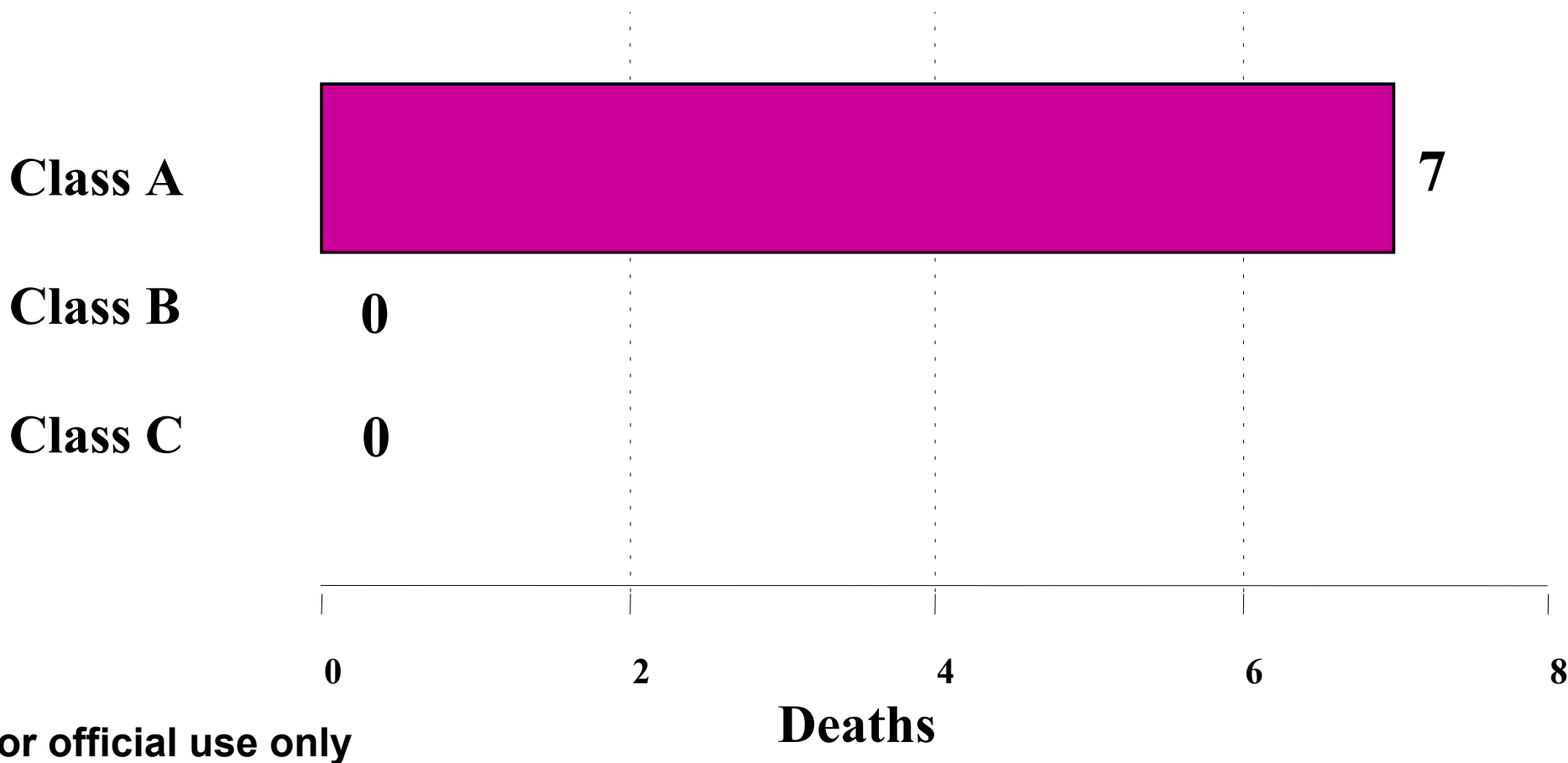


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**166 mishaps during the 5 year period
were METOC related.**

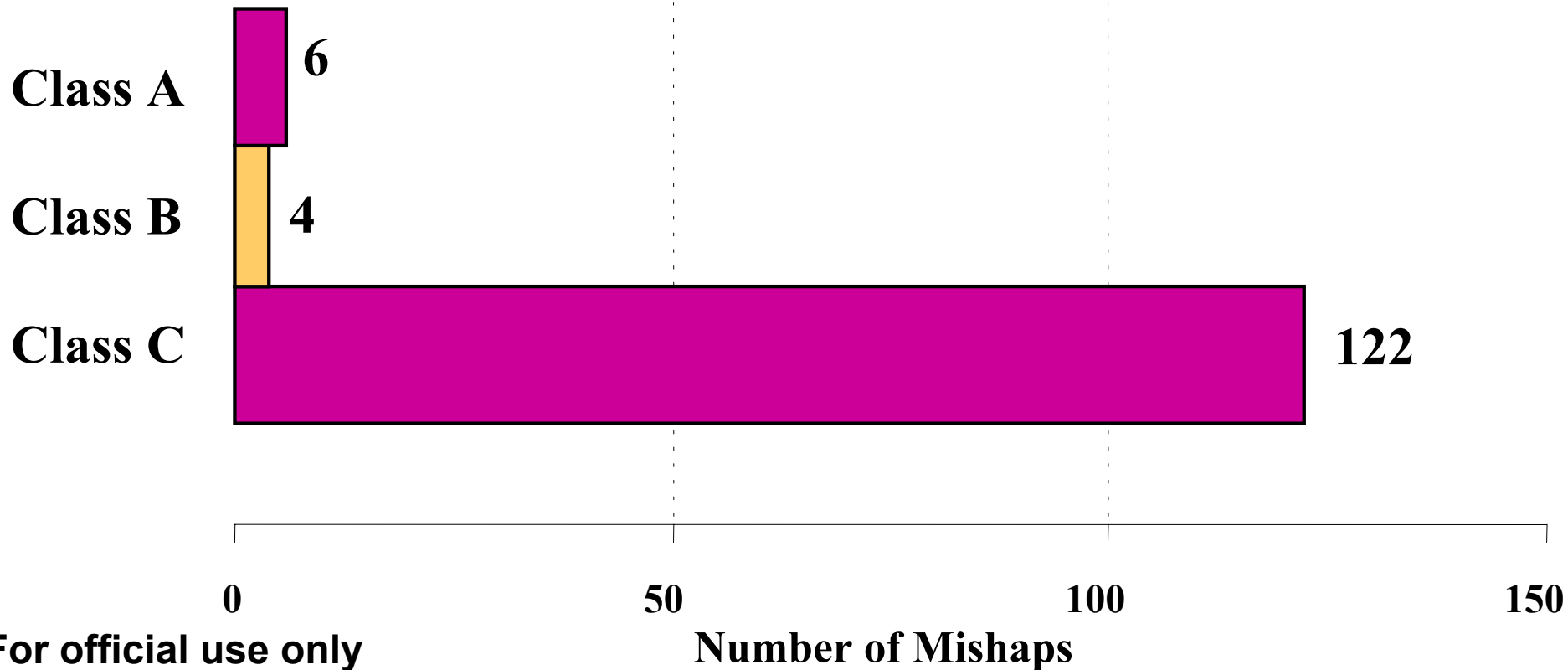
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Deaths Due to METOC Related Mishaps



A total of 7 crew members killed during the 5 years, for an average of 1.5 deaths per year

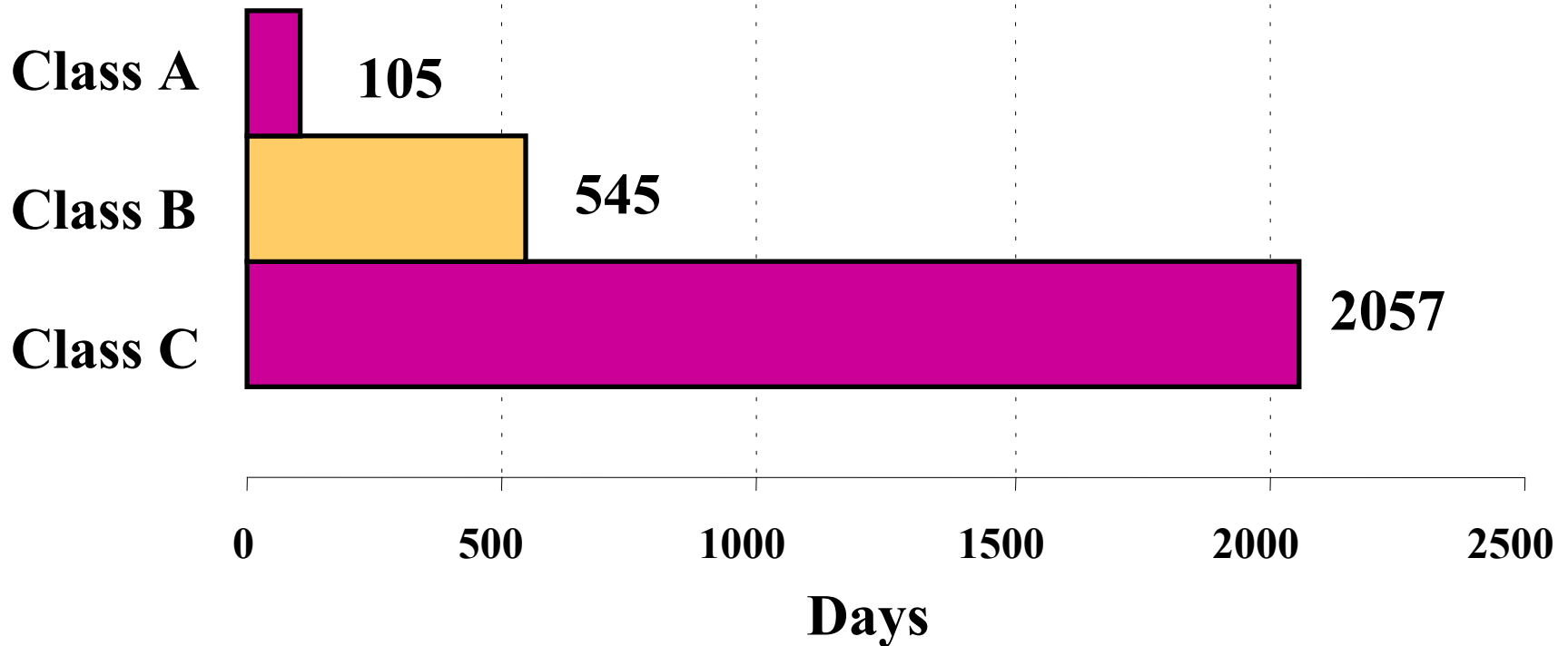
METOC Related Mishaps Resulting in Personal Injury



132 (80%) of the 166 METOC related mishaps involved personal injury.

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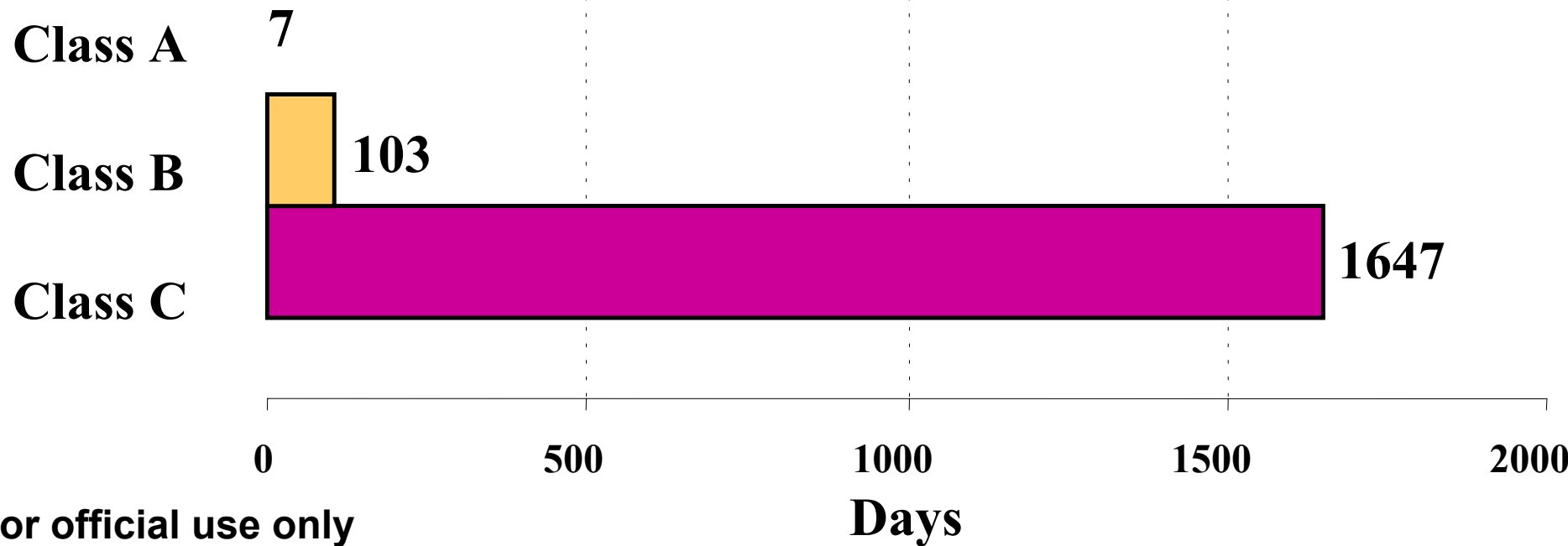
Lost Work Days Due to METOC Related Mishaps



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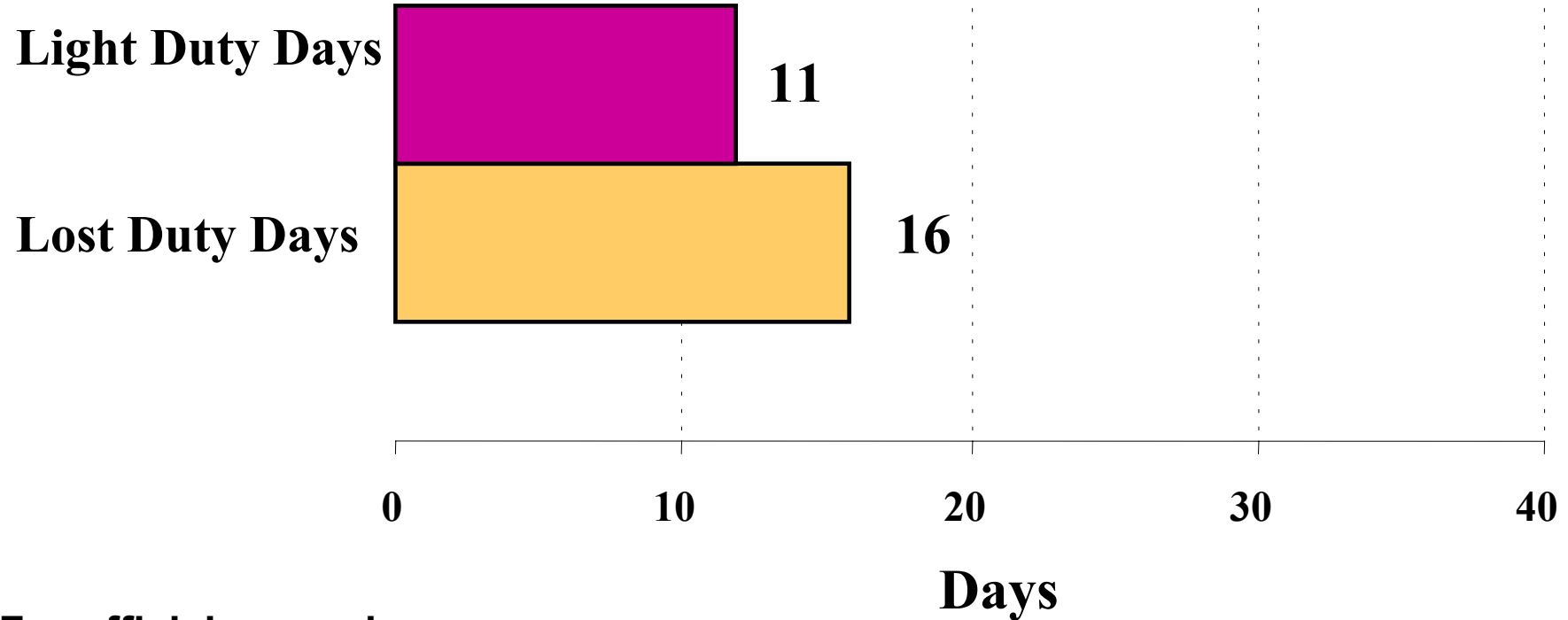
**Total lost work days over 5 years: 2707,
for an average of 540 days per year.**

Light Duty Days Due to METOC Related Mishaps



**Total light duty days over 5 years: 1757,
for an average of 350 days per year.**

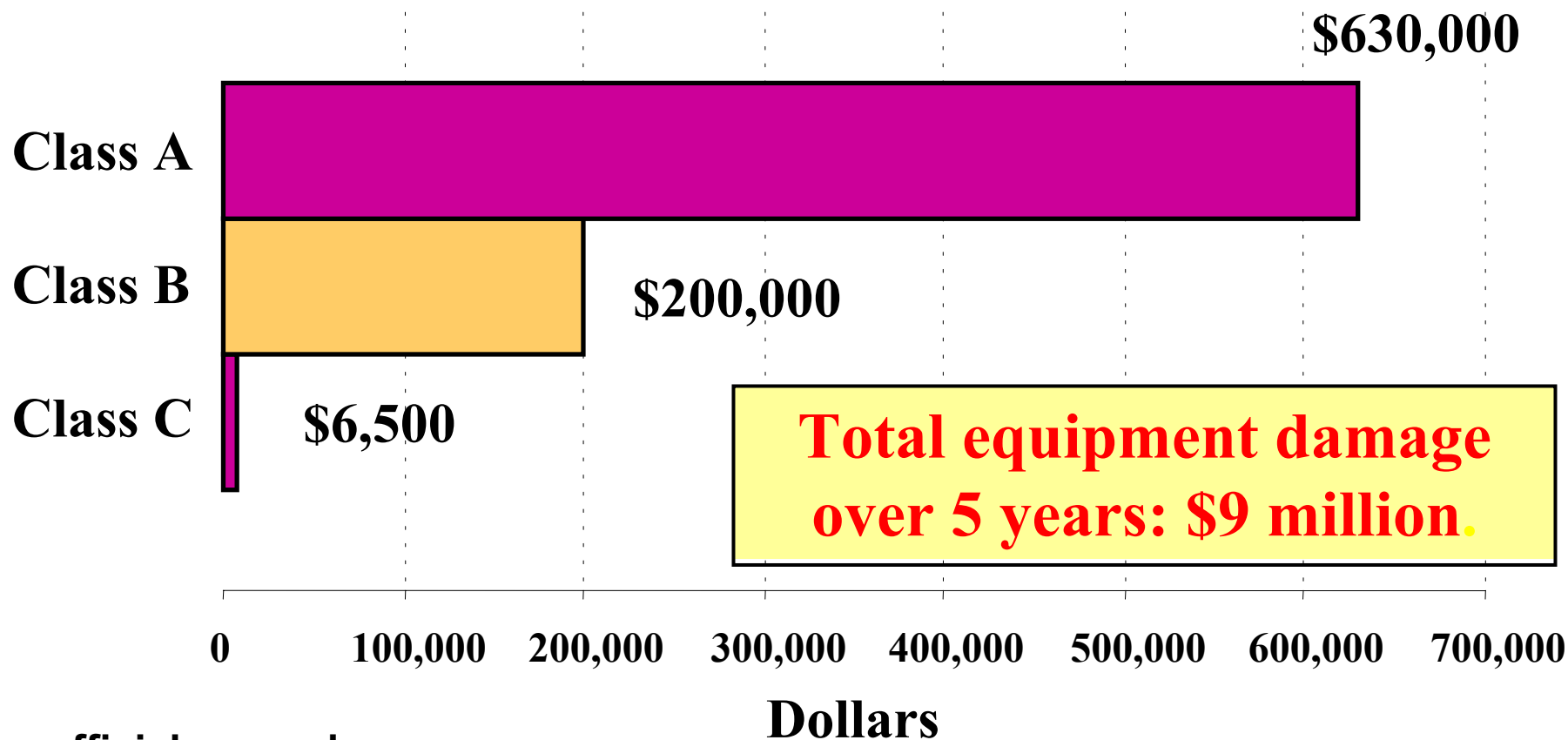
Average Light and Lost Duty Days Per METOC Related Mishaps



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Total of 2.5 people on light or lost duty status per day during 5-year period due to MRMs.

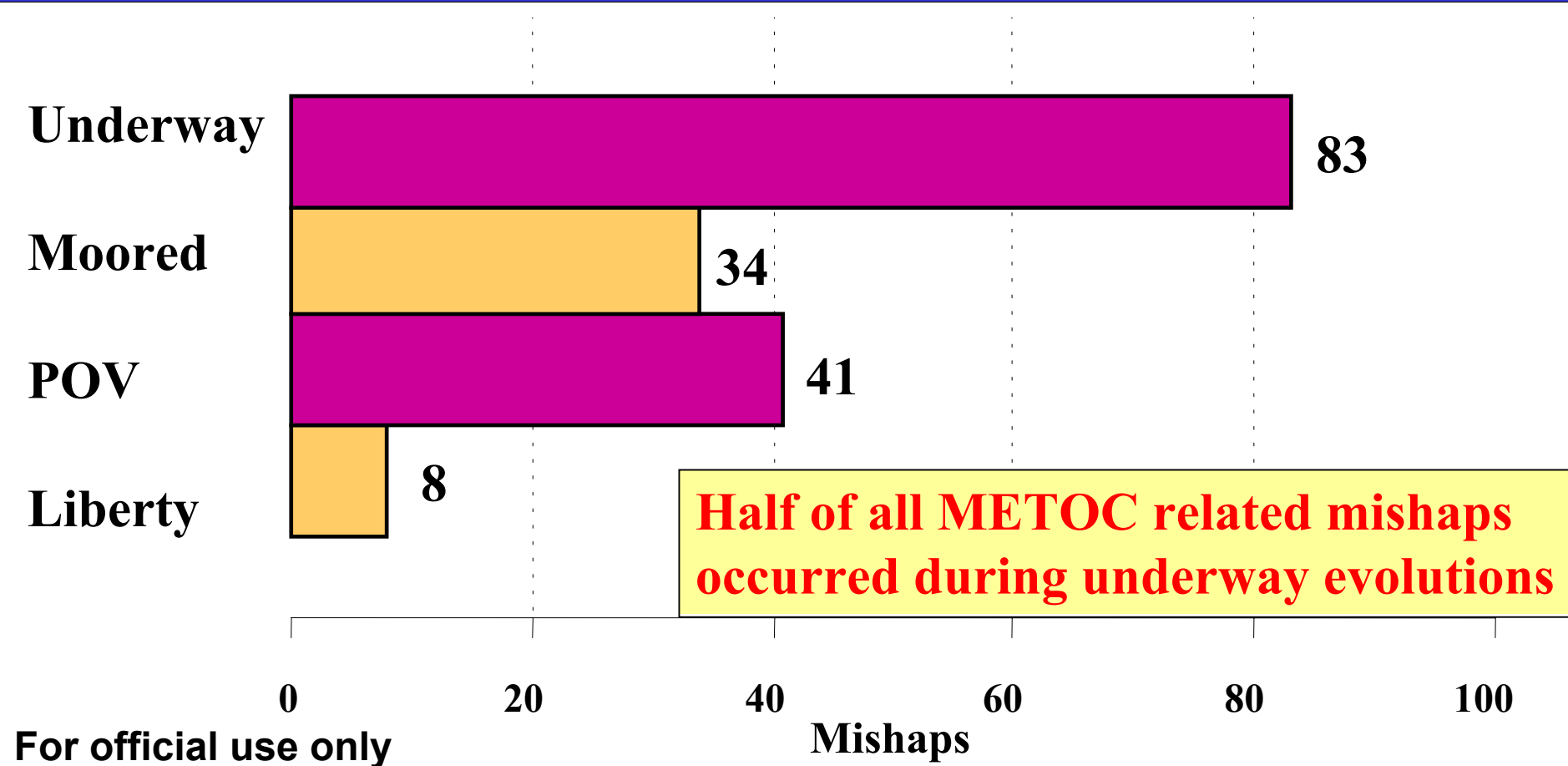
Average Damage Per METOC Related Mishap



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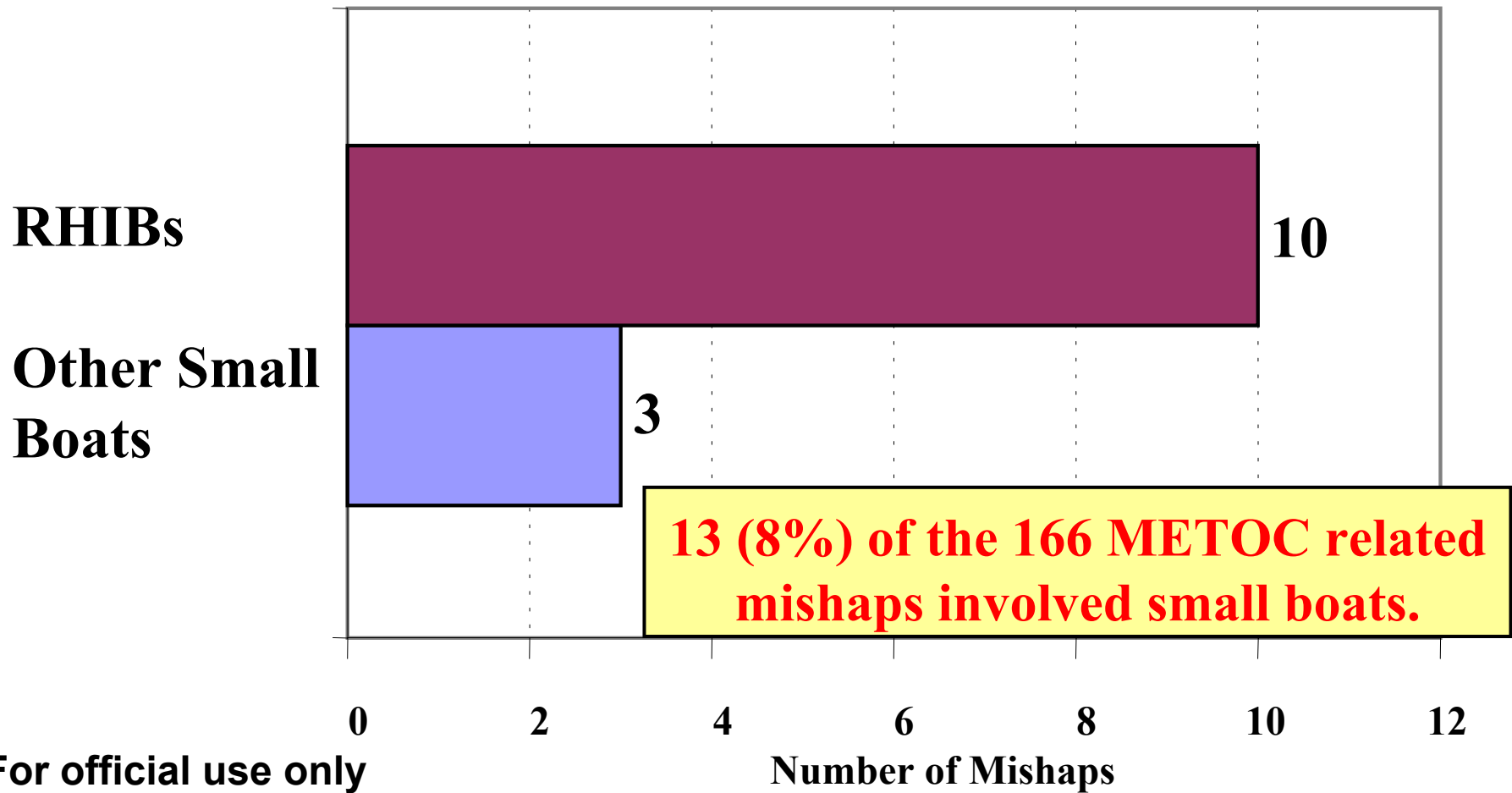
Average cost per MRM: \$54,200.

Operation Type Involved in METOC Related Mishaps



25% of METOC related mishaps involved POVs.

Small Boat METOC Related Mishaps



Note: All of these mishaps involved ship-owned small boats.

Impacts of Small Boat MRMs

Number of Deaths		0
Number of Injuries		12
Amputations		1
Fractures		3
Back Injuries		3
Soft Tissue Damage		5
Lost Duty Days	14% of MRM total	381
Light Duty Days	22% of MRM total	378
Equipment Costs		\$15,000

**Small boat mishaps have a very high labor cost:
over 750 days of lost or light duty in last 5 years!**

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Groupings of Phenomena Involved in METOC Related Mishaps

High Winds and Seas

Rain

Ice & Snow

High Winds

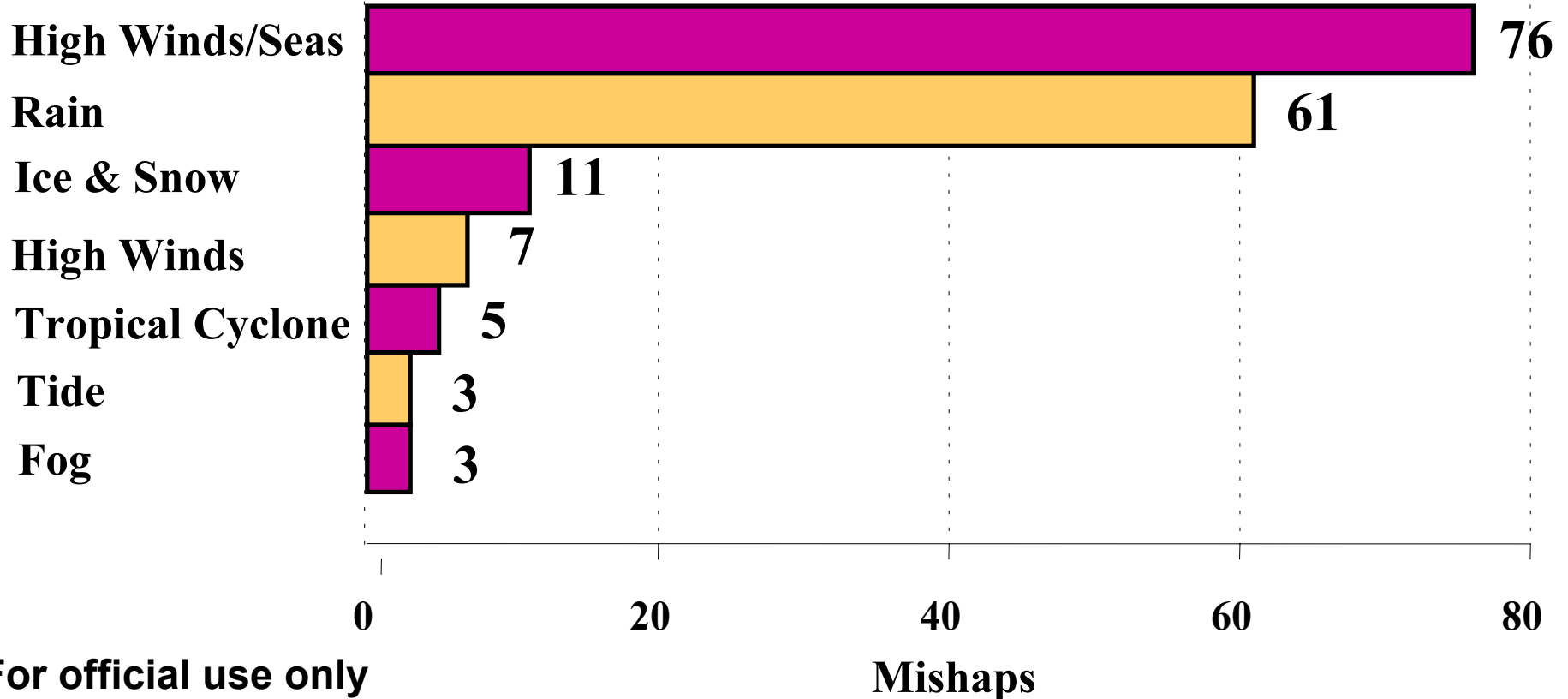
Tropical Cyclone

Tide

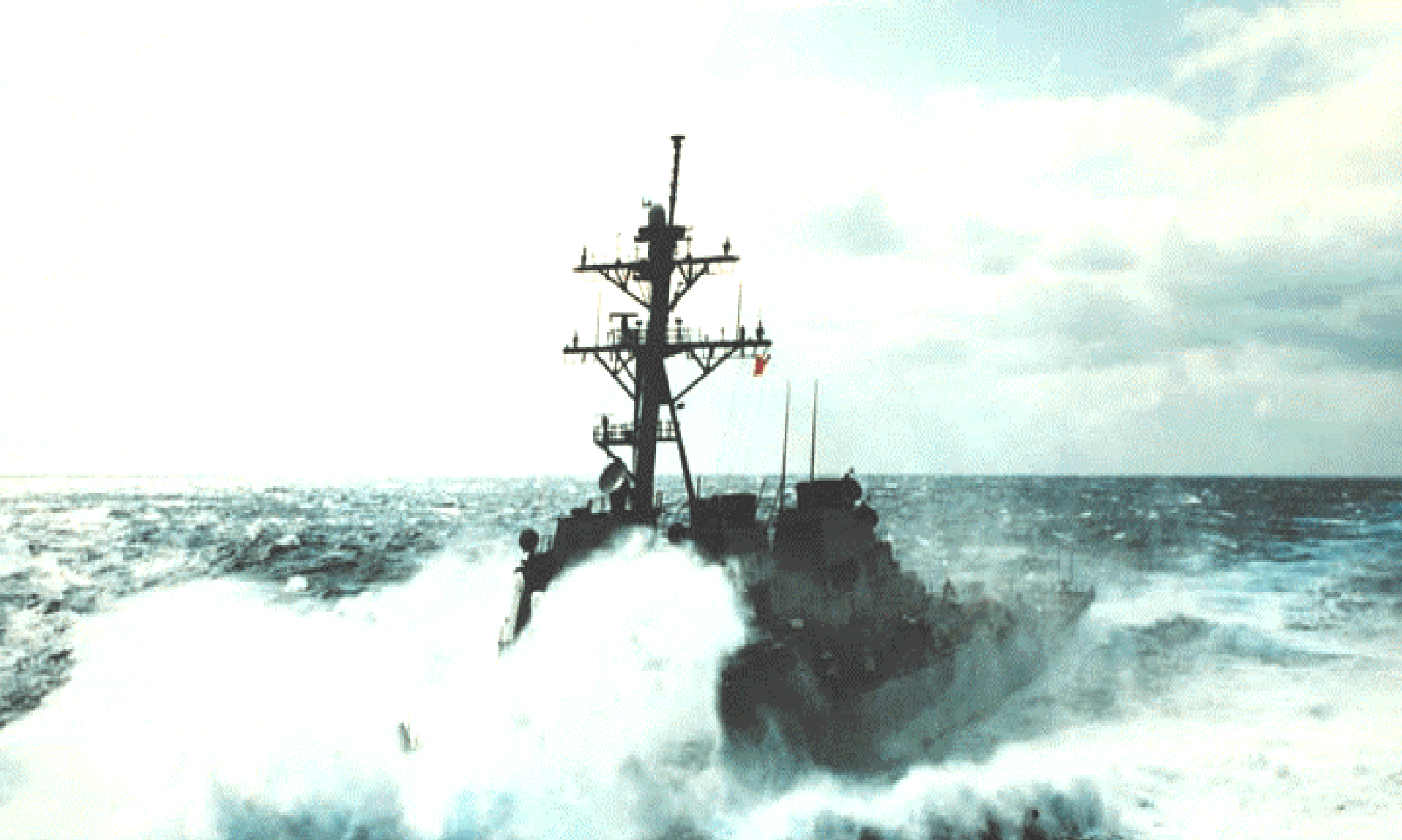
Fog

**This grouping of phenomena is
based primarily on the terms
used in the mishap reports.**

Phenomena Involved in METOC Related Mishaps



Major phenomena: High winds/seas for all mishap classes; rain for personal vehicle mishaps.



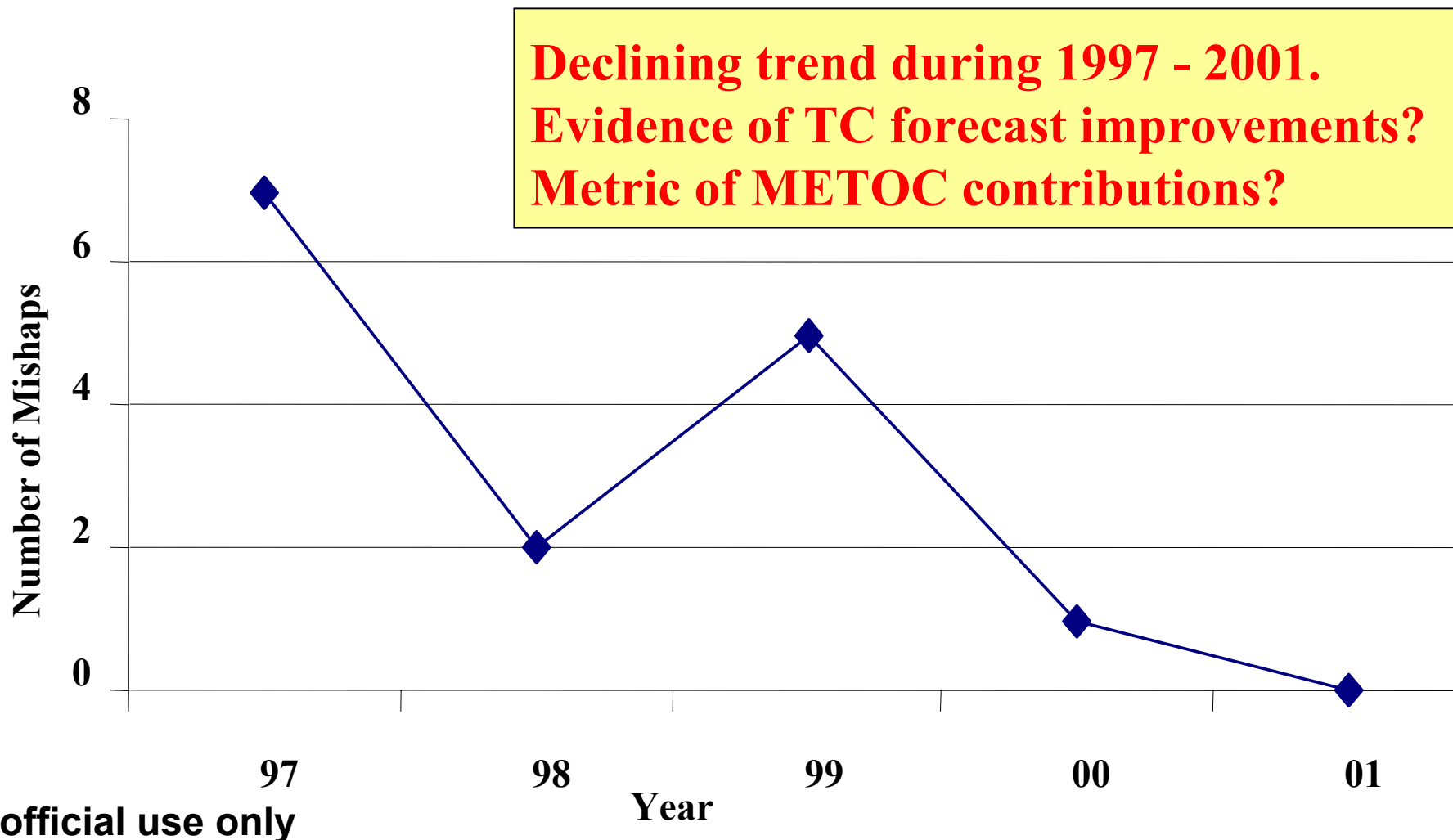
**High winds/seas message is not getting out!
Or if it is, it is not being understood, or people are not
properly trained to deal with these phenomena.**

Tropical Cyclone Related Mishaps

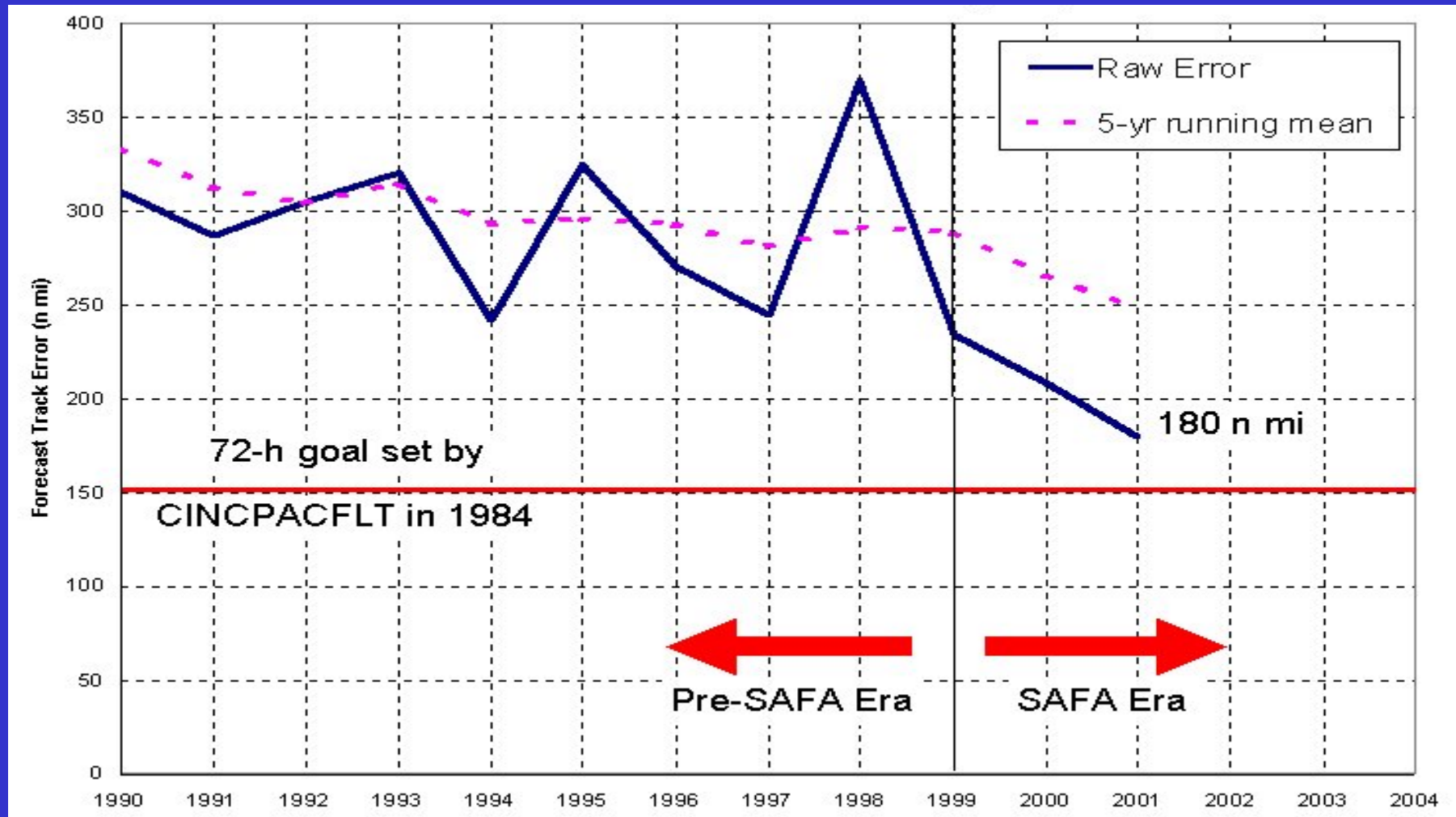
	1997	1998	1999	2000	2001	Basin Total
NW Atlantic	2	1	5	0	0	8
NW Pacific	4	0	0	1	0	5
SW Pacific	1	1	0	0	0	2
Other Basins	0	0	0	0	0	0
Annual Total	7	2	5	1	0	15

**Mishap reports identified only 5 TC related mishaps.
Supplemental TC best track data revealed that 15 (9%)
of the 166 MRMs were TC related.**

Tropical Cyclone Related Mishaps



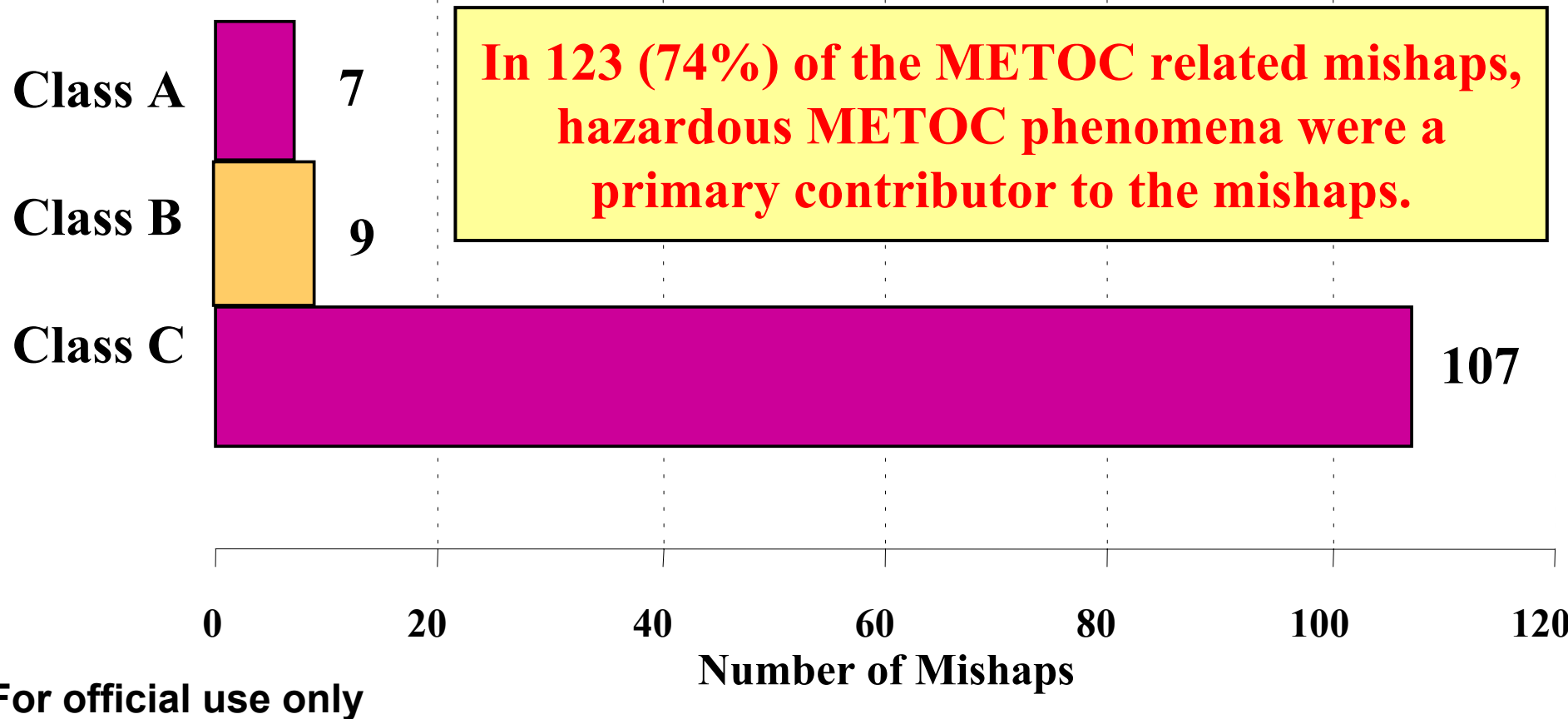
TC Track Forecast Errors, NW Pacific, 1990-2001



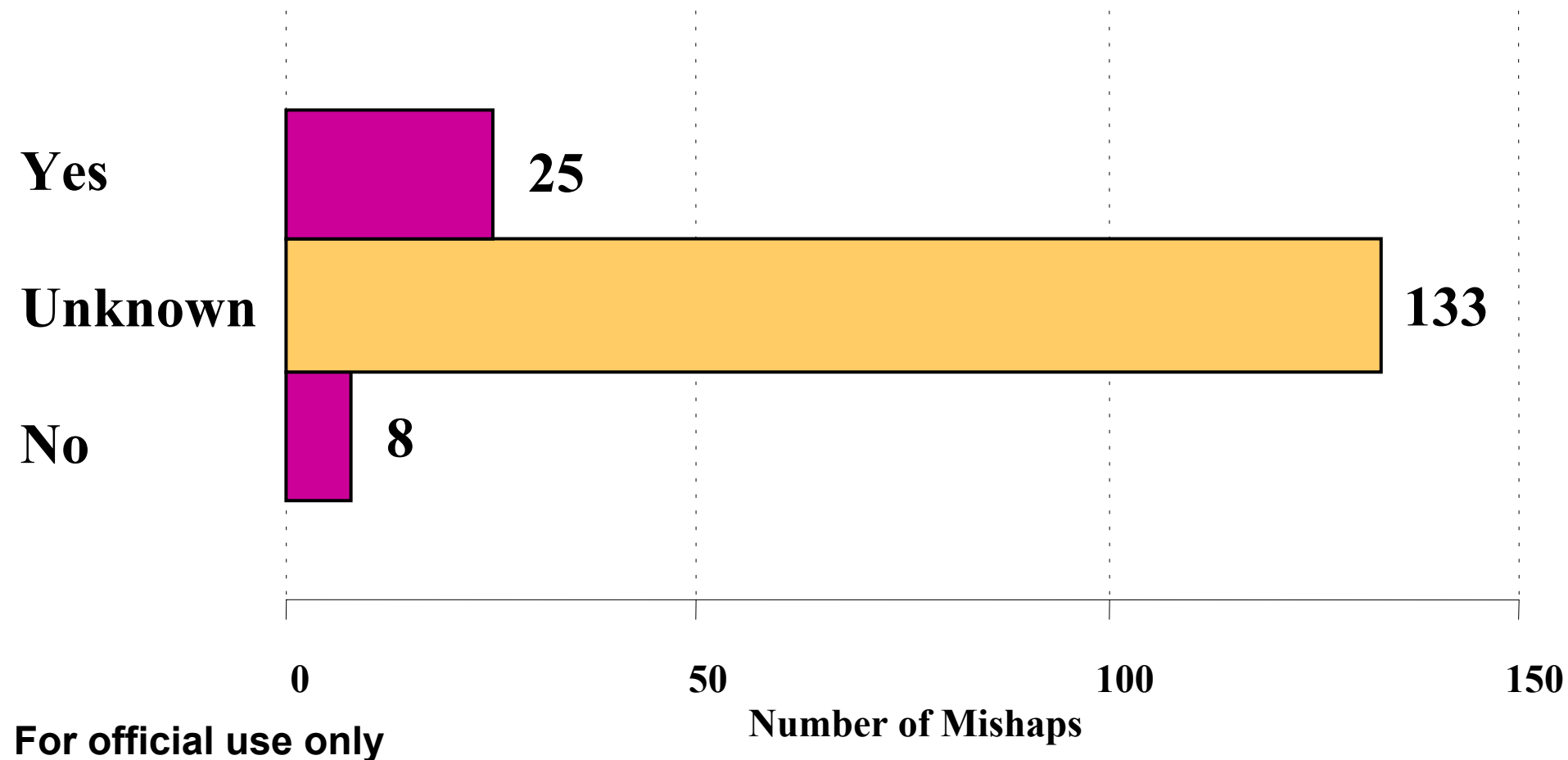
**SAFA = Systematic Approach Forecasting Aid,
developed and applied at NPS and JTWC**

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Mishaps That Would Not Have Happened in a Benign Environment

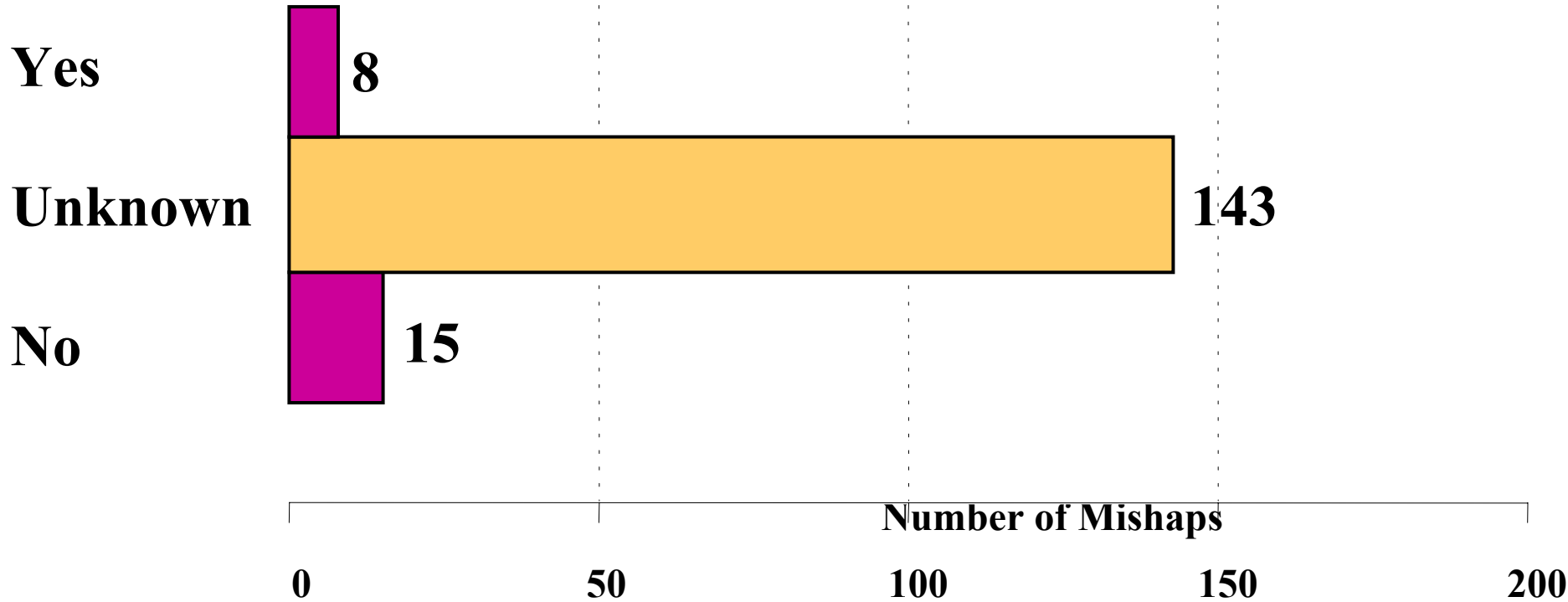


Was a METOC Forecast Provided for METOC Related Mishap?



For 133 (80%) of the 166 MRMs, we could not determine if a forecast was provided.

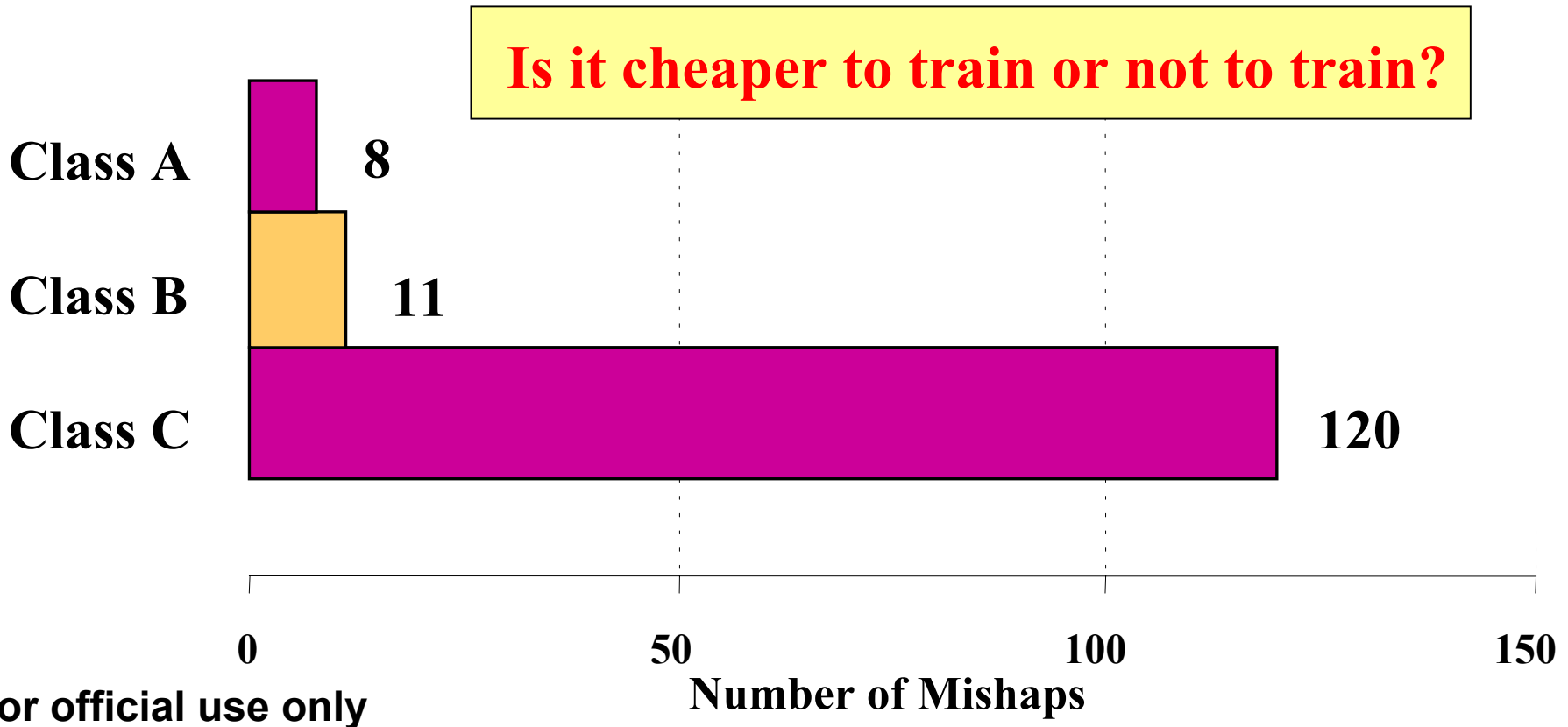
Was a METOC Brief Provided for METOC Related Mishap?



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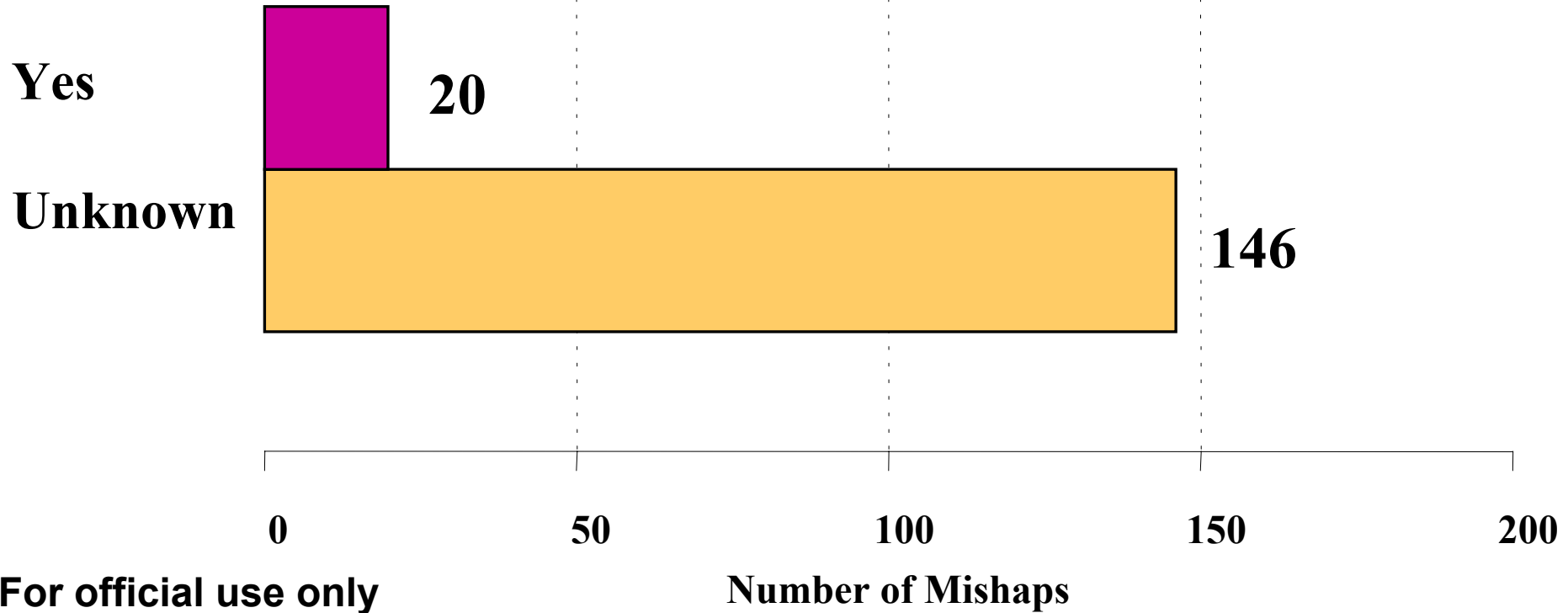
For 143 (86%) of the 166 MRMs, we could not determine if a brief was given.

METOC Related Mishaps Involving Training Deficiencies



84% of MRMs involved inadequate training on how to assess, manage, and/or operate in adverse phenomena.

Were Appropriate Procedures Followed for Dealing With METOC Phenomena?



Challenges of This Study

- **Relatively little METOC information is included in even very well written afloat MRs and MIRs**
- **Many afloat MRs and MIRs are under-reported. Thus, they do not give a full accounting of the nature of the mishaps or their true costs.**

Challenges of This Study

It appears that under-reporting is done in order to:

- **understate the true costs (e.g., in personnel injuries, equipment damage, lost labor, lost dollars, etc.)**
 - **minimize or diffuse responsibility for the mishaps**
 - **protect careers**
-
- **It appears that some mishaps go unreported (i.e., not reported at all).**
 - **The true costs of under-reported or unreported mishaps may be hidden within general operating expenses.**

Key Findings

Mishap reports need expanded operator and METOC data. Model: aviation mishap reporting.

Supplemental METOC info can fill some data gaps.

Under-reporting of mishaps appears to be significant.

METOC products often not available:

- in operator ready form**
- for some evolutions**

Lack of training in assessing and managing METOC risks is a major factor in afloat MRMs.

Products From This Study

- 1. Developed database of METOC related afloat mishaps.**
- 2. Identified & developed METOC related training modules for afloat community.**
- 3. Developed METOC related ORM metrics for METOC and Afloat communities (including OTSR analysis conducted by LCDR Hinz, NLMOC).**
- 4. Developed data sets and system for METOC impacts assessments.**
- 5. Developed and delivered recommendations to METOC, Afloat, and Safety communities.**